

U.S. Serial No. 09/632,739

28. (Amended) The method of claim 72 or 77, further comprising the steps of:  
controlling the time of operation of a compressor generating the compressed air  
and the timing of intake valves cooperating with the first and the second intake ports; and,  
controlling one or more air charge characteristics selected from the group  
consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.
36. (Amended) The method of claim 73, 76, 78, or 79, wherein a first intake valve cooperates  
with the first intake port and a second intake valve cooperates with the second intake port,  
the second intake valve occupying an open position only while the first intake valve  
occupies a closed position.
37. (Amended) The method of claim 36, further comprising the steps of:  
controlling the time of operation of a compressor generating the compressed air  
and the timing of the first and the second intake valves; and,  
controlling one or more air charge characteristics selected from the group  
consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.
38. (Amended) The method of claim 73, 76, 78, or 79, wherein a first intake valve cooperates  
with the first intake port and a second intake valve cooperates with the second intake port,  
the second intake valve occupying an open position only during the compression stroke.
39. (Amended) The method of claim 38, further comprising the steps of:  
controlling the time of operation of a compressor generating the compressed air  
and the timing of the first and the second intake valves; and,  
controlling one or more air charge characteristics selected from the group  
consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.
40. (Amended) The method of claim 73, 76, 78, or 79, further comprising the steps of:  
cooling the compressed air prior to entry thereof into the cylinder.

U.S. Serial No. 09/632,739

46. (Amended) The method of claim 45, further comprising the steps of:  
controlling the time of operation of a compressor generating the high pressure air charge and the timing of the first and the second intake valves; and,  
controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.
48. (Amended) The method of claim 47, further comprising the steps of:  
controlling the time of operation of a compressor generating the high pressure air charge and the timing of the first and the second intake valves; and,  
controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.
52. (Amended) The method of claim 74, wherein the primary air charge is at a first pressure and the secondary air charge is at a second pressure, the second pressure being greater than the first pressure.
53. (Amended) The method of claim 74, wherein the directing of the primary air charge into the cylinder is completed before the introducing of the secondary air charge into the cylinder.
54. (Amended) The method of claim 74, wherein a first intake valve selectively occludes the first intake port and a second intake valve selectively occludes the second intake port, the first intake valve occupying an open position only while the second intake valve occupies a closed position.

U.S. Serial No. 09/632,739

55. (Amended) The method of claim 54, further comprising the steps of:
- controlling the time of operation of a compressor generating the secondary air charge and the timing of the first and the second intake valves; and,
  - controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.
56. (Amended) The method of claim 74, wherein a first intake valve cooperates with the first intake port and a second intake valve cooperates with the second intake port, the second intake valve occupying an open position only during the compression stroke.
57. (Amended) The method of claim 56, further comprising the steps of:
- controlling the time of operation of a compressor generating the secondary air charge and the timing of the first and the second intake valves; and,
  - controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.
59. (Amended) The method of claim 74, further comprising the step of:
- cooling the primary air charge prior to entry thereof into the cylinder.
60. (Amended) The method of claim 74, further comprising the step of:
- cooling the secondary air charge prior to entry thereof into the cylinder.
62. (Amended) The method of claim 75, further comprising the steps of:
- directing air at a first pressure to the first intake port; and,
  - directing air at a second pressure to the second intake port.
64. (Amended) The method of claim 75, further comprising the step of:
- cooling the air directed into the cylinder.

U.S. Serial No. 09/632,739

Please add the following new claims 72 – 86:

72. (New) A method for operating an internal combustion engine, the method comprising the steps of:

directing air through a first intake port to a cylinder during an intake stroke of a piston cooperating with the cylinder; ,

directing compressed air through a second intake port to the cylinder only during a compression stroke of the piston; and

adjusting the air charge volumes within the cylinder, thereby providing a compression ratio lower than the expansion ratio of the engine.

73. A method of operating an internal combustion engine, the method comprising the steps of:

introducing air through a first intake port into a cylinder during an intake stroke of a piston cooperating with the cylinder;

introducing compressed air through a second intake port into the cylinder during a compression stroke of the piston.; and

adjusting the air charge volumes within the cylinder, thereby providing a compression ratio lower than the expansion ratio of the engine.

74. A method for operating an internal combustion engine, the method comprising the steps of:

directing a primary air charge through a first inlet port into a cylinder;

compressing a secondary air charge outside of the cylinder;

introducing the secondary air charge through a second inlet port of the cylinder,

after compression has begun within the cylinder; and

lightly compressing the primary air charge prior to directing thereof into the cylinder.

U.S. Serial No. 09/632,739

75. A method for operating an internal combustion engine, said method comprising the steps of:

directing air to a cylinder through a first intake port;  
directing air to the cylinder through a second intake port having an intake valve cooperating therewith, the intake valve opening and closing during a compression stroke of a piston cooperating with the cylinder; and  
adjusting the air charge volumes within the cylinder, thereby providing a compression ratio lower than the expansion ratio of the engine.

76. (New) A method of operating an internal combustion engine, the method comprising the steps of:

introducing air through a first intake port into a cylinder during an intake stroke of a piston cooperating with the cylinder;  
introducing compressed air through a second intake port into the cylinder during a compression stroke of the piston.; and  
adjusting the air charge density within the cylinder, thereby providing a charge density greater than that which could be produced by the compression ratio of the engine.

77. (New) A method of operating an internal combustion engine, the method comprising the steps of:

directing air through a first intake port into a cylinder during an intake stroke of a piston cooperating with the cylinder; and,  
increasing the air charge density and turbulence in the engine, including the step of directing compressed air through a second intake port into the cylinder during a compression stroke of the piston.

U.S. Serial No. 09/632,739

78. (New) A method of operating an internal combustion engine including at least one cylinder with associated combustion chamber, the method comprising the steps of:
- introducing air through a first intake port into the at least one cylinder during an intake stroke of a piston cooperating with the cylinder; and,
  - producing a super-charged air density and increasing turbulence in a low compression engine, including the step of introducing compressed air through a second intake port into the at least one cylinder during a compression stroke of the piston.
79. (New) A method of operating an internal combustion engine, the method comprising the steps of:
- providing an engine with lower than normal compression ratios;
  - introducing air through a first intake port into a cylinder of the engine during an intake stroke of a piston cooperating with the cylinder; and,
  - introducing compressed air through a second intake port into the cylinder during a compression stroke and after compression has begun.
80. (New) A method of operating an internal combustion engine having a crankshaft driven by at least one piston moving through a plurality of power cycles, each power cycle involving at least a compression stroke and an expansion stroke aided by combustion taking place within a cylinder, wherein the compression stroke results in compressing of air and fuel within the cylinder, said method comprising the steps of
- introducing during each power cycle air through a first port into a cylinder; and
  - introducing during each power cycle a compressed air charge through a second port into the cylinder, including the step of varying the compressed air charge introduced in one cycle of the plurality of power cycles from the compressed air charge introduced during another of the cycles of the plurality of power cycles.

U.S. Serial No. 09/632,739

81. (New) A method of operating an internal combustion engine having a crankshaft driven by at least one piston moving through a plurality of power cycles, each power cycle involving at least a compression stroke and an expansion stroke aided by combustion taking place within a cylinder, wherein the compression stroke results in compressing of air and fuel within the cylinder, said method comprising the steps of
- introducing during each power cycle air through a first port into a cylinder; and
  - introducing during each power cycle a compressed air charge through a second port into the cylinder, including the step of introducing the compressed air charge into a cylinder which has a lower than normal compression ratio.
82. (New) The method of claim 80 or 81, wherein a first intake valve cooperates with the first port and a second intake valve cooperates with the second port, the second intake valve occupying an open position only while the first intake valve occupies a closed position.
83. (New) The method of claim 82, further comprising the steps of:
- controlling the time of operation of a compressor generating the compressed air and the timing of the first and the second intake valves; and,
  - controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.
84. (New) The method of claim 80 or 81, wherein a first intake valve cooperates with the first port and a second intake valve cooperates with the second port, the second intake valve occupying an open position only during the compression stroke.
85. (New) The method of claim 84, further comprising the steps of:
- controlling the time of operation of a compressor generating the compressed air and the timing of the first and the second intake valves; and,
  - controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.